AMENDMENTS TO THE CLAIMS

Applicant submits below a complete listing of the current claims, including marked-up claims with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing. This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of the Claims

1-28. (Canceled)

29. (Currently amended) An integrated circuit chip comprising:

a semiconductor substrate comprising at least one transistor; and

a pump in fluid communication with a ventilating duct and configured to provide pressure sufficient to set a fluid in motion through the ventilating duct so as to cool the integrated circuit chip, the pump comprising:

a cavity disposed on the semiconductor substrate;

a conductive layer covering at least a portion of an interior of the cavity;

a flexible membrane, including a conductive material, placed above the cavity;

a dielectric layer that provides insulation between portions of the conductive layer and the conductive material of the flexible membrane which are close to each other;

a pumping volume defined between the conductive layer and the flexible membrane;

~~at least one opening that provides fluid communication to~~a first opening and a second opening, each opening disposed on the same side of the flexible membrane and providing fluid communication to the pumping volume through the conductive layer;

terminals to receive and apply voltage between the conductive layer and the flexible membrane to cause the flexible membrane to move; and

wherein the flexible membrane is ~~configured~~ constructed and arranged to cover [[the]] at least one of the first opening and the second opening and produce the pressure sufficient to set a

fluid in motion through the ventilating duct so as to cool the integrated chip upon application of the voltage.

30. (Previously presented) The integrated circuit chip of claim 29, wherein the cavity has a cup shape so that an interval between the conductive layer and the membrane progressively increases from a border, formed between the cavity and an upper surface of the substrate, to a bottom of the cavity.

31. (Currently amended) The integrated circuit chip of claim 29, wherein the ~~at least one~~ first opening is positioned substantially at a bottom of the cavity.

32. (Currently amended) The integrated circuit chip of claim 29, ~~further comprising~~ awherein the ventilating duct is formed at least partially in the semiconductor substrate of the integrated circuit and ~~that~~ leads to the ~~at least one~~ first opening.

33. (Previously presented) The integrated circuit chip of claim 29, wherein the dielectric layer is disposed on the conductive layer.

34. (Previously presented) The integrated circuit chip of claim 29, wherein the dielectric layer is disposed on the flexible membrane.

35. (Previously presented) The integrated circuit chip of claim 29, wherein the flexible membrane comprises a conductive material.

36. (Currently amended) The integrated circuit chip of claim 29, wherein ~~the at least one opening comprises a first opening and a second opening, each opening providing fluid communication to the pumping volume through the conductive layer and configured to set the fluid in a directional motion~~the first opening and the second opening are constructed and arranged to cause fluid introduced into the pumping volume through the second opening to move in a direction

predominantly from the second opening toward the first opening upon application of the voltage to the flexible membrane.

37. (Currently amended) The integrated circuit chip of claim [[36]]29, ~~further comprising a first~~wherein the ventilating duct comprises a first ventilating duct formed at least partially in the semiconductor substrate of the integrated circuit and that leads to the first opening and further comprising a second ventilating duct formed at least partially in the semiconductor substrate and that leads to the second opening.

38. (Currently amended) The integrated circuit chip of claim [[36]]29, wherein application of the voltage to the terminals causes the flexible membrane to move toward the conductive layer to close fluid communication between the second opening and the pumping volume.

39. (Currently amended) ~~The integrated circuit chip of claim 36~~An integrated circuit chip comprising:

a semiconductor substrate comprising at least one transistor; and

a pump in fluid communication with a ventilating duct and configured to provide pressure sufficient to set a fluid in motion through the ventilating duct so as to cool the integrated circuit chip, the pump comprising:

a cavity disposed on the semiconductor substrate;

a conductive layer covering at least a portion of an interior of the cavity;

a flexible membrane, including a conductive material, placed above the cavity;

a dielectric layer that provides insulation between portions of the conductive layer and the conductive material of the flexible membrane which are close to each other;

a pumping volume defined between the conductive layer and the flexible membrane;

a first opening and a second opening, each opening providing fluid communication to the pumping volume through the conductive layer and configured to set the fluid in a directional motion, wherein the second opening is positioned closer to a border of the cavity than the first

opening is positioned to the border, the border being between the cavity and an upper surface of the substrate, and the first opening positioned closer to a center of the cavity than the second opening;

terminals to receive and apply voltage between the conductive layer and the flexible membrane to cause the flexible membrane to move; and

wherein the flexible membrane is configured to cover the at least one opening upon application of the voltage.

40. (Previously Presented) The integrated circuit chip of claim 39, wherein upon application of a sufficient voltage between the conductive layer and the membrane, the flexible membrane is adapted to deform in a motion toward the conductive layer so as to cover the second opening and not the first opening.

41. (Currently amended) The integrated circuit chip of claim [[36]]29, wherein the flexible membrane is configured to cover at least the second opening when the voltage is applied.

42. (Currently amended) The integrated circuit chip of claim [[36]]29, wherein the second opening is larger than the first opening to promote the introduction of more air through the second opening than the first opening to the pumping volume when the voltage is reduced.

43. (Currently amended) An integrated circuit chip comprising:

a semiconductor substrate comprising at least one transistor and at least one ventilating duct; and

a pump configured to provide pressure sufficient to set a fluid in motion through the at least one ventilating duct so as to cool the integrated circuit chip, the pump being disposed on the semiconductor substrate and in fluid communication with the at least one ventilating duct, the pump including a cavity disposed on the semiconductor substrate and a flexible membrane disposed on the cavity, wherein the cavity includes a first opening and a second opening, each opening disposed on the same side of the flexible membrane and providing fluid communication between the cavity and the at least one ventilating duct, wherein the flexible membrane is constructed and arranged to

produce the pressure sufficient to cause fluid motion through the at least one ventilating duct so as to cool the integrated circuit chip upon actuation.

44. (Canceled)

45. (Currently amended) The integrated circuit chip of claim [[44]]43, wherein the pump comprises a conductive layer covering at least a portion of an interior of the cavity.

46. (Currently amended) The integrated circuit chip of claim 45, ~~further comprising at least one~~ whcrein the first and second opening ~~that~~ provides fluid communication between the at least one ventilating duct and the ~~pump~~ cavity through the conductive layer.

47. (Currently amended) The integrated circuit chip of claim 44, wherein the ~~pump comprises a~~ flexible membrane ~~that~~ includes a conductive material~~, wherein the flexible membrane is disposed above the cavity~~.

48. (Previously presented) The integrated circuit chip of claim 47, wherein the pump comprises a dielectric layer that provides insulation between portions of a conductive layer and the conductive material of the flexible membrane, the conductive layer and the conductive material being in close proximity to one another.

49. (Previously Presented) The integrated circuit chip of claim 48, wherein the pump comprises terminals to receive and apply voltage between the conductive layer and the flexible membrane to cause the flexible membrane to move.

50. (Currently amended) The integrated circuit chip of claim 49, wherein the flexible membrane is configured to cover at least one opening in the conductive layer that provides fluid communication between the ~~pump~~ cavity and the at least one ventilating duct upon application of the voltage.

51. (New) The integrated circuit chip of claim 50, wherein the first opening and the second opening are constructed and arranged to cause fluid introduced into the pumping volume through the second opening to move in a direction predominantly from the second opening toward the first opening upon actuation of the flexible membrane.